

Observing Scenarios and Multi-messenger Implications for the International Gravitational-Wave Network during O4 and O5

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An advanced LIGO and Virgo's third observing run brought another binary neutron star merger (BNS) and the first neutron-star black hole mergers. While no confirmed kilonovae were identified in conjunction with any of these events, continued improvements of analyses surrounding GW170817 allow us to project constraints on the Hubble Constant (H_0), the Galactic enrichment from r -process nucleosynthesis, and ultra-dense matter possible from forthcoming events. Here, we describe the expected constraints based on the latest expected event rates from the international gravitational-wave network (IGWN) and analyses of GW170817. We show the expected detection rate of gravitational waves and their counterparts, as well as how sensitive potential constraints are to the observed numbers of counterparts. We intend this analysis as support for the community when creating scientifically driven electromagnetic follow-up proposals.

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